

UNITED STATES PATENT OFFICE.

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PROCESS OF PREPARING CELLULOSE FROM WOOD.

SPECIFICATION forming part of Letters Patent No. 480,334, dated August 9, 1892.

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To all whom it may concern:

Be it known that I, HERMANN ADELBERT ALFRED MASTE, engineer, a subject of the King of Prussia and German Emperor, residing at Arnsberg, in the Kingdom of Prussia and German Empire, have invented a certain new and useful Process of Preparing Cellulose from Wood; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to a process by which from wood cellular tissues—sulphite cellulose—are produced, which are completely free from all incrustations.

The new process consists in first softening the outside portions of the wood by steaming in any suitable vessel; the wood, preferably pine-wood, being first torn up to small pieces by well-known machines. The softening of the wood is best attained by the application of steam at a pressure of one-half to one atmosphere. The air which after steaming is still present in the wood and in the vessel where the steaming took place is then removed by means of an air-pump, which is set to work immediately after the steaming is finished, and which continues pumping until the mixture of air and steam, as well as all the air which is contained in the pores of the wood, is sucked out. While the vessel containing the wood is still under the influence of the vacuum a cold sulphite solution is allowed to enter the vessel, care being taken that no outside air can penetrate the interior of the vessel. So much liquor is allowed to run into the latter that it is filled up to the top. The liquor readily fills up all the capillary tubes of the wood, and this takes place all the more easy, as owing to the vacuum the capillary tubes, devoid of air, take up the liquor with eagerness. For the purpose of filling up the intercellular spaces of the wood with the sulphite liquor a forcing-pump is then set to work in such a manner that the hydraulic pressure exercised by it does not act as a constant pressure—that is to say, not a continuous pressure, but as a pressure which

acts by interruptedly-applied temporary shocks. This latter kind of action is brought about in the following manner: As soon as a pressure of fifteen atmospheres is reached in the vessel some liquor is allowed to run off by the opening of a tap until the pressure sinks to eight atmospheres. The pump is then restarted until the pressure has increased to about sixteen atmospheres and the pressure is again lowered to ten atmospheres in the manner described. This pressing in of liquor by interrupted strokes or shocks is carried out from twenty to forty times, according to the density and condition of the wood under treatment, whereby the maximum pressure is gradually increased to about twenty atmospheres. If any air-bubbles are still inclosed in the wood substance, they escape under the influence of the repeated shocks, air giving way to sulphite-liquor. As soon as the impregnation is finished the liquor in the vessel is gradually driven out of it by steam, great care being again taken that the admission of the outside air is completely excluded. The steam is admitted to the vessel through a pipe, and the pressure of the steam forces all the liquor surrounding the wood out of the vessel, leaving the wood impregnated, as before described. The impregnated wood then remains under the influence of steam of three to five atmosphere pressure at a temperature of 120° centigrade to 150° centigrade for some six to eight hours—that is to say, until a complete chemical decomposition of the intercellular substance has taken place. This is the case when the intercellular substance by the chemical action of the sulphurous acid is converted into a state where it is soluble in water. The prepared wood, which has become soft, is then boiled with hot water for several hours at a pressure of two to five atmospheres, either in the same or in another vessel. It is very useful to pass the treated wood through a stamping-mill before it is boiled with water. The product finally obtained is sulphite cellulose, which contains no adhering intercellular substances, and can be used after suitable preparation for the manufacture of paper in a well-known manner.

What I claim is—

1. The process of making sulphite cellulose, which consists in first softening the ligneous material by steam heat, then forcing a sulphite solution into the material under repeated variations of pressure, and finally decomposing the intercellular substance by steam heat, substantially as set forth.
2. The process of making sulphite cellulose, which consists in first softening the ligneous material by steam heat, then reducing the pressure in the vessel below that of the atmos-

phere to free the material from steam and air, then forcing a sulphite solution into the material under repeated variation of pressure, and finally decomposing the intercellular substances by steam heat, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HERMANN ADELBERT ALFRED MASTE.

Witnesses:

WM. ESSENWEIN,
RUDOLPH FRICKS.